We claim:

1. A composition for use in anti-angiogenic or angiogenic therapy comprising:

a) an angiostatin agonist, partial agonist, inverse agonist, antagonist and/or angiostatin allosteric modulator, and

b) a suitable carrier.

2. The composition of claim 1, wherein the angiostatin agonist, partial agonist, inverse agonist, antagonist and/or angiostatin allosteric modulator are selected from the group consisting of antibodies, antibody fragments, enzymes, peptides and oligonucleotides.

3. The composition of claim 1, wherein the angiostatin agonist, angiostatin partial agonist, inverse agonist and/or angiostatin allosteric modulator is a conjugate of an anti-tumor agent that does not bind to the alpha or beta subunits of F1 ATP synthase and a compound that does bind to the alpha or beta subunits of F1 ATP synthase.

4. The composition of claim 1, wherein the angiostatin agonist, partial agonist, inverse agonist, antagonist and/or angiostatin allosteric modulator is an antibody or an antibody fragment.

5. The composition of claim 4, wherein the antibody is a monoclonal antibody or antibody fragment thereof.

6. The composition of claim 4, wherein the antibody is a humanized antibody or antibody fragment thereof.

7. The composition of claim 1, wherein the angiostatin agonist, partial agonist, inverse agonist, antagonist and/or angiostatin allosteric modulator are present in or conjugated onto a liposome or microparticle that is of a suitable size for intraveneous administration but that lodges in capillary beds.

8. The composition of claim 1, further comprising an anti-tumor agent that does not bind to the alpha or beta subunits of F1 ATP synthase.

9. The composition of claim 1, further comprising a COX-2 inhibitor.

10. The composition of claim 1, further comprising an angiogenesis-promoting agent that does not bind to the alpha or beta subunits of F1 ATP synthase.

11. A method of inhibiting angiogenesis, comprising administering to a patient in need of treatment thereof an effective, angiogenesis inhibiting amount of an angiostatin agonist, angiostatin partial agonist or angiostatin allosteric promoter.

12. The method of claim 11, wherein the angiostatin agonist, angiostatin partial agonist or angiostatin allosteric promoter is a compound selected from the group consisting of antibodies, antibody fragments, enzymes, peptides and oligonucleotides.

13. The method of claim 11, wherein the angiostatin agonist, angiostatin partial agonist or angiostatin allosteric promoter is a conjugate of an anti-tumor agent that does not bind

to the alpha or beta subunits of F1 ATP synthase and an angiostatin agonist, angiostatin partial agonist or angiostatin allosteric promoter.

14. The method of claim 11, wherein the angiostatin agonist, angiostatin partial agonist or angiostatin allosteric promoter is an antibody or an antibody fragment.

15. The method of claim 14, wherein the antibody is a monoclonal antibody or antibody fragment thereof.

16. The method of claim 14, wherein the antibody is a humanized antibody or antibody fragment thereof.

17. The method of claim 11, wherein the angiostatin agonist, angiostatin partial agonist or angiostatin allosteric promoter are present in or conjugated onto a liposome or microparticle that is of a suitable size for intraveneous administration but that lodges in capillary beds.

18. The method of claim 11, further comprising administering an anti-tumor agent that does not bind to the alpha or beta subunits of F1 ATP synthase.

19. The method of claim 11, further comprising administering a COX-2 inhibitor.

20. The method of claim 11, wherein the angiostatin agonist, angiostatin partial agonist or angiostatin allosteric promoter is administered intravenously, intramuscularly, intradermally or subcutaneously.

21. A method of promoting angiogenesis, comprising administering to a patient in need of treatment thereof an effective, angiogenesis-promoting amount of an angiostatin antagonist or an angiostatin allosteric inhibitor.

22. The method of claim 21, wherein the angiostatin antagonist or an angiostatin allosteric inhibitor is a compound selected from the group consisting of antibodies, antibody fragments, enzymes, peptides, and oligonucleotides.

23. The method of claim 21, wherein the angiostatin antagonist or angiostatin allosteric inhibitor is a conjugate of an angiogenesis-promoting compound that does not bind to the alpha or beta subunits of F1 ATP synthase and an angiostatin antagonist or angiostatin allosteric inhibitor.

24. The method of claim 21, wherein the angiostatin antagonist or angiostatin allosteric inhibitor is an antibody or antibody fragment.

25. The method of claim 24, wherein the antibody is a monoclonal antibody or antibody fragment thereof.

26. The method of claim 24, wherein the antibody is a humanized antibody or antibody fragment thereof.

27. The method of claim 21, wherein the angiostatin antagonist or angiostatin allosteric inhibitor are present in or conjugated to a liposome or microparticle that is of a suitable size for intraveneous administration but that lodges in capillary beds.

28. The method of claim 21, further comprising administering an angiogenesis-promoting agent that does not bind to the alpha or beta subunits of F1 ATP synthase.

29. The method of claim 21, wherein the angiostatin antagonist or angiostatin allosteric inhibitor is administered intravenously or intramuscularly.

30. The method of claim 21, wherein the angiostatin antagonist or angiostatin allosteric inhibitor is administered locally to a location in a patient in need of increased vascularization.

31. A method of screening a test compound for its ability to inhibit or enhance the binding of angiostatin to ATP synthase comprising:

i) contacting the test compound and angiostatin with the alpha and/or beta subunits of ATP synthase under conditions such that angiostatin can bind to the subunits in the absence of the test compound, and

ii) determining the amount of angiostatin bound to the subunits, and comparing that amount to an amount of angiostatin bound to the subunits in the absence of the test compound, wherein a reduction in the amount of angiostatin bound to the alpha and/or beta subunits of ATP synthase in the presence of the test compound indicates that the test compound inhibits the binding of angiostatin to the subunits, and wherein an increase of the amount of angiostatin bound to the alpha and/or beta subunits of ATP synthase in the presence of the test compound indicates that the test compound enhances the binding of angiostatin to the subunits.

32. The method of claim 31 wherein the angiostatin bears a detectable label.

33. The method of claim 31 wherein the alpha and/or beta subunits of ATP synthase are attached to a solid support.

34. The method of claim 31 wherein the alpha and/or beta subunits of ATP synthase are associated with a lipid membrane.

35. The method of claim 34 wherein the membrane is a membrane of an intact cell.

36. The method of claim 35 wherein the cell naturally expresses ATP synthase.

37. The method of claim 35 wherein the cell has been transformed with one or more nucleic acid sequence that encode the alpha, beta, delta, gamma and/or epsilon subunits of ATP synthase.

38. A compound identified in the method of claim 31 as inhibiting the binding of angiostatin to the alpha and/or beta subunits of ATP synthase.

39. A compound identified in the method of claim 31 as enhancing the binding of angiostatin to the alpha and/or beta subunits of ATP synthase.

40. A method of screening a test compound for its ability to modulate a bioactivity resulting from binding of angiostatin to the alpha and/or beta subunits of ATP synthase comprising:

i) contacting the test compound and angiostatin with a cell that expresses the alpha and/or beta subunits of ATP synthase under conditions such that angiostatin can bind to the subunits in the absence of the test compound, and

ii) determining the amount of angiostatin required to achieve the same bioactivity in the presence of the test compound as in the absence of the test compound, wherein a reduction in the amount of angiostatin required to achieve the same bioactivity in the presence of the test compound indicates that the test compound is an angiostatin agonist, partial agonist or allosteric inhibitor, and wherein an increase in the amount of angiostatin required to achieve the same bioactivity in the presence of the test compound indicates that the test compound is an angiostatin antagonist or allosteric promoter.

41. An angiostatin agonist, partial agonist or allosteric inhibitor identified in accordance with the method of claim 40.

42. An angiostatin antagonist or allosteric promoter identified in accordance with the method of claim 40.

43. The method of claim 40 wherein the bioactivity is inhibition of endothelial cell proliferation, migration, tube formation, cell surface ATP synthesis, ATP hydrolysis, *in vivo* inhibition of angiogenesis, or *in vivo* inhibition of tumor growth.

44. The method of claim 40 wherein the bioactivity is enhancement of proton pumping.

45. An expression construct comprising a vector and a nucleic acid sequence encoding the alpha and/or beta subunits of ATP synthase, operably linked to a promoter.

46. A host cell comprising the construct of claim 45.

47. A method of producing the alpha and/or beta subunits of ATP synthase, comprising culturing the host cell of claim 46 under conditions such that the nucleic acid is expressed and the alpha and/or beta subunits of ATP synthase are thereby produced.

48. A monoclonal antibody or antibody fragment thereof specific for the alpha and/or beta subunits of ATP synthase that functions as an angiostatin agonist.

49. A monoclonal antibody or antibody fragment thereof specific for the alpha and/or beta subunits of ATP synthase that functions as an angiostatin partial agonist.

50. A monoclonal antibody or antibody fragment thereof specific for the alpha and/or beta subunits of ATP synthase that functions as an angiostatin inverse agonist.

51. A monoclonal antibody or antibody fragment thereof specific for the alpha and/or beta subunits of ATP synthase that functions as an angiostatin antagonist.

52. A monoclonal antibody or antibody fragment thereof specific for the alpha and/or beta subunits of ATP synthase that functions as an angiostatin allosteric modulator.